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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
| 09/764,457      | 01/19/2001  | Sachio Uto           | 520.39440X00        | 7365             |

20457 7590 11/20/2002

ANTONELLI TERRY STOUT AND KRAUS  
SUITE 1800  
1300 NORTH SEVENTEENTH STREET  
ARLINGTON, VA 22209

EXAMINER

JOHNSTON, PHILLIP A

| ART UNIT | PAPER NUMBER |
|----------|--------------|
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2881

DATE MAILED: 11/20/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/764,457

Applicant(s)

UTO ET AL.

Examiner

Phillip A Johnston

Art Unit

2881

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-19 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 19 January 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_.
- 4) ☐ Interview Summary (PTO-413) Paper No(s) \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

***Detailed Action***

***Claims Rejection – 35 U.S.C. 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which the subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1,2, and 9-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Noguchi(377), in view of Kokuchi (009).

Noguchi (377) discloses in Figure 3, an optical apparatus for defect detection that includes a stage unit 300 comprising a substrate mounting base 304, x, y and z stages 301, 302 and 303 and a stage controller 305; 3 illumination optical systems 100 having a laser-beam source 101, a beam splitter comprising a concave lens 102 and a convex lens 103 and an illumination lens 104 having a conical surface; a detection optical system 200 including a detection lens 201, a spatial filter 202, an image formation lens 203, an ND (Neutral Density) filter 207, a beam splitter 204, a polarization device 208 and one-dimensional detectors (image sensors) 205 and 206 which are each implemented typically by a TDI image sensor; an image-signal processing unit 400. The illumination optical systems 100 has light emitted by the laser-beam

source 101, being converted into slit-shaped beams 3 which are radiated to a wafer 1 or an inspected substrate 1 mounted on the substrate mounting base 304 from 3 directions 10, 11 and 12 on a plane. See Column 14, line 47-59, and Column 15, line 27-34. In addition, the laser-beam source 101, may be a high-output YAG laser SHG for generating a second harmonic wave with a wavelength of 532 nm, which is a DUV (deep ultraviolet) laser source, as noted in Column 17, line 41-45, and Column 34, line 21.

Noguchi (377) further discloses that the invention provides an image-signal processing unit 400 characterized in that a variation (a standard deviation) among chips is computed for each pixel in the chip and used for setting a threshold value, and a defect such as a foreign particle in an area with a small variation is detected by using a small threshold value while a defect such as a foreign particle in an area with a big variation is detected by using a large threshold value. In this way, the threshold value for an area with a small variation can be reduced without being affected by an area with a big variation. An example of an area with a small variation is the memory-cell area in the case of a memory LSI. As a result, it is possible to detect an infinitesimal foreign particle with a size not exceeding 0.1 $\mu$ m. See Column 35, line 35-48.

Kikuchi (009) discloses an ultraviolet laser apparatus that includes an optic resonator and a coherence reduction optical system, recited in Claims 2 and 17, respectively. As described in column 9, line 48-58, and column 12, line 50-55, Kikuchi (009), discloses a laser light generating device where the phase-

modulated laser beam is converted by wavelength conversion means into a laser beam of a shorter wavelength at the same time as it is further enlarged in spectral width. The result is that the coherence distance of the laser beam is shortened to suppress the speckle noise. In this case, the post-wavelength-conversion laser light is phase-modulated since the resonant frequency of a resonator inclusive of a non-linear optical crystal is coincident with the frequency of the fundamental wavelength laser light beam, wavelength conversion is performed with a high conversion efficiency. The phase modulation is performed by phase modulation units 54, and wavelength-converted by second harmonics generating units 55 to form second harmonics for widening the spectral width. That is, temporal coherence is lowered. The generated second harmonics are then modulated by image signals by intensity modulation unit 56. Subsequently, the lowering in temporal coherence is converted into that in spatial coherence for reducing the speckle noise in the laser beam.

It would have been obvious to one of ordinary skill in the art that Noguchis'(377) defect inspection apparatus can be modified to use the laser light generating means in accordance with the teaching of Kokuchi (009) to reduce speckle. Thereby reducing the systems susceptibility to noise produced by the interference pattern, resulting in improved foreign particle detect-ability.

3. Claims 3-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Noguchi (377), in view of Kikuchi (009), as applied to Claims 1,2, and 9-19 above, and in further view of Nakasuji (399)

Nakasuji (399), discloses in Figures 1-3, a system and method for defect inspection that includes a minienvironment unit 20, which comprises a housing 22 forming a minienvironment space 21 such that the atmosphere therein can be controlled; a gas circulation system 23 (231-233) for circulating a gas, such as clean air, through the minienvironment space 21 for controlling the atmosphere therein; a discharge system 24 for recovering and expelling a portion of the air being supplied into the minienvironment space 21. The housing 22 comprises a top plate 221, a floor plate 222, and four sidewalls 223, constructed to isolate the minienvironment space 21 from the outside. In addition, sensors for monitoring air cleanliness may also be provided in the minienvironment space. This enables the system to be shut down promptly if air cleanliness is found to have been degraded.

In addition, it is well known in the art to utilize multi walled housing Construction, as recited in Claims 3-5, to protect equipment for hermetical sealing and thermal shielding reasons, for example U.S. Patent No. 6,396,061.

Hence, it would have been obvious to anyone of ordinary skill in the art that one could design an inspection system according to Noguchi (377), and use the environmental chamber in accordance with the teaching of Nakasuji (399).

***Conclusion***

4. Any inquiry concerning this communication or earlier communications should be directed to Phillip Johnston whose telephone number is (703) 305-7022. The examiner can normally be reached on Monday-Friday from 8:00 am to 5:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiners supervisor John Lee can be reached at (703) 308-4116. The fax phone numbers are (703) 308-2864 and (703) 308-7721.

PJ  
November 14, 2002

  
BRUCE ANDERSON  
PRIMARY EXAMINER